

**REMARKS**

Claims 25-35 are active in the application. Claims 1-24 have been withdrawn from consideration.

5           Claim 26 has been amended to reflect the range set forth on page 39, line 13 of the application.

          Claim 35 was objected to under 35 USC 112. The claim has been amended to make it more clear. In particular, claim 35 specifies that fixed to one of two opposite outer surfaces of the resin portion such that the frame is parallel with the rod lenses.

10           Claims 27, 28, and 33 have been rewritten to make them more clear. The scope of these claims has not been changed.

          Attached are substitute drawing sheets which add the label "Related Art" to Figures 11, 17, 18, and 19. This labeling should overcome the objection raised in the office action. Formal drawings will be filed at such time as the substitute drawing sheets  
15           are accepted.

          Claims 26, 29-30 and 34-35 were rejected under 35 USC 102(b) as being anticipated by US patent 5,638,479 to Takami et al. These rejections are traversed. Takami et al. teach that the rod lenses have rough surfaces on the *endfaces*, instead of on peripheral surfaces, as in the present invention. The Examiner should note that the  
20           peripheral surface is different from the end faces of the lens as disclosed in Takami, and, as such, the claims are clearly not anticipated by Takami.

          Claims 25, 27, and 31-33 were rejected under 35 USC 103(a) as being unpatentable over Takami et al. These rejections are also traversed on the grounds that Takami et al. teach that the rod lenses have rough surfaces on the *endfaces*, instead of on  
25           peripheral surfaces, as in the present invention.

          Claim 28 was rejected under 35 USC 103(a) as being unpatentable in view of Takami et al. and McDaniel et al. This rejection is traversed. McDaniel et al. is silent about a distribution or standard deviation of the diameters of a plurality of rod lenses. As such, no combination of the references would make claim 28 obvious to one of ordinary  
30           skill in the art.

The present invention provides rod lenses having carefully defined roughness on the peripheral surfaces. The peripheral surfaces are defined as the curved surfaces of the cylindrical rod lenses. See for example Figure 18 of the application, which shows asperites 23 on the peripheral surfaces, and the text bridging pages 5 and 6 of the application. The flat endfaces of the present rod lenses are not rough; they are polished, as known in the art. The flat endfaces are depicted in Figures 1a and 1b of the application and are the portions which are at the end of the lens. Thus, the peripheral surfaces of the cylindrical surfaces of the rod lenses are at issue in the present application, and the peripheral surfaces do not include the endfaces. The carefully defined roughness of the peripheral surfaces prevents scattered light from propagating through the lens, while also minimizing the variations in effective lens aperture and resolving power. These advantages of the present invention are explained in detail on pages 41-42 of the specification. These advantages are only realized if the rough surface as described in the present invention are provided on the peripheral (i.e. curved) surfaces of the cylindrical rod lens.

Claims 25-27, and 29-35 all include limitations relating to surface characteristics (e.g., surface roughness, standard deviation of surface roughness, ) of the *peripheral* surface of the rod lens. In the present invention, the peripheral surface is the curved surface of a cylinder, not the flat endfaces. The surface characteristics of the present invention do not apply to the endfaces. This interpretation of "peripheral surface" is supported in the specification at page 5, line 20 through page 6, line 3. Also, page 33, lines 4-6 teach that the roughness of the peripheral surface is measured "in the axial direction", which implies that the peripheral surface is necessarily the curved surface of the cylindrical rod lenses. No axial direction measurement is possible along the surface of an endface.

Takami et al., by comparison teach that a rod lens can have rough *endfaces*, with the rough endfaces covered by a coating that fills the rough surface features to provide a smooth endface and protection from ozone (see col. 3, lines 25-31). The coating material of Takami et al. must be transparent because it is located on the endface through which light is transmitted. In Fig. 5 of Takami et al. surfaces 20 are endfaces, through which light passes. As noted in col. 4, lines 25-27, the roughness of endfaces 20 is produced by

diamond wheel cutting. Also, Takami et al. recite in col. 9, lines 35-37 that the "...first and second rough *end* surfaces have[ing] a maximum roughness (Rmax) of about 0.5  $\mu\text{m}$  to about 5  $\mu\text{m}$ ;" Also, col. 5, lines 59-64, which mentions center-line average roughness, refers to the rough endfaces, not to peripheral surfaces as defined in the present claims. In  
 5 col. 9, lines 54-60 it is further noted by Takami et al. that the rough end surfaces have a light transmitting coating that smoothes the rough surfaces. Smoothing the rough endfaces with the coating is necessary for the device to function as a lens.

Wholly absent from Takami et al. is any teaching or suggestion to roughen the *peripheral* surfaces of a rod lens. Takami et al. only teach that endfaces are roughened.  
 10 Also, it is noted that Takami et al. cannot reasonably be altered to apply to peripheral surfaces because Takami et al. must have a transparent, optical quality coating covering and smoothing the rough end surface features. Such a coating would be undesirable on the peripheral surfaces of the claimed rod lens because it would produce specular reflections. The undesirable effects of specular reflections from the peripheral surface are  
 15 described on page 5 of the present specification with reference to Fig. 17. Also, a coating that smoothes over the rough peripheral surface would remove the beneficial effects of the peripheral surface roughness (e.g. scattering). Hence, Takami et al. cannot reasonably be altered to meet the present claims because to do so would require modifications hostile to the intentions of Takami et al., such as the use of a light-absorbing coating. The  
 20 teachings of Takami et al. cannot conceivably meet the limitations of the present claims specifying rough peripheral surfaces. Further, Therefore, the rejections of claims 25-27 and 29-35 are improper and must be withdrawn.

Claim 28 requires that the *standard deviation* of the diameters of the rod lenses in the array be within the prescribed range of 0.01  $\mu\text{m}$  to 2.5  $\mu\text{m}$ . In other words, the rod  
 25 lenses according to claim 28 have a narrow range of diameters. The 0.250  $\mu\text{m}$  diameter in col. 11 of McDaniel et al. refers to an actual diameter of a single rod lens, not a standard deviation or range for a plurality of lenses. It is noted that the 0.250  $\mu\text{m}$  figure for the GRIN lens diameter is almost certainly a typographical error, since GRIN lenses do not have such small diameters (especially in combination with a length of 329  $\mu\text{m}$ , which  
 30 produces an extreme aspect ratio). Also, Figs. 6 and 7 show by label and by drawing scale that the GRIN lens has a 250  $\mu\text{m}$  diameter. McDaniel et al. do not teach or suggest any

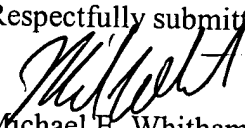
specific standard deviation or distribution of diameters for a collection of GRIN lenses. As correctly noted by the Examiner, Takami et al. is also silent with regard to the distribution of diameters of rod lenses in an array. Hence, no conceivable combination of Takami et al. and McDaniel et al. can meet the limitations set forth in claim 28, and the rejection of this claim must therefore be withdrawn.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 25-35 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees for the petition or for entry of this amendment to Attorney's Deposit Account No. 50-2041 (Whitham, Curtis & Christofferson P.C.).

Respectfully submitted,

  
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